

A New Species of *Helminthoglypta* (Gastropoda: Pulmonata: Helminthoglyptidae) from the Cuyamaca Mountains of Southern California

by

RICHARD L. REEDER

Faculty of Biological Science, University of Tulsa, Tulsa, Oklahoma 74104, U.S.A.

Abstract. A new species of land snail, *Helminthoglypta milleri* Reeder, is described from the Cuyamaca Mountains of San Diego County, California, and its relationships are discussed.

IN THE LATE 1800's, Henry Hemphill collected snails from the Cuyamaca Mountains, in San Diego County, which he labeled *Epiphragmophora traskii* v. *cuyamacensis*. He sent specimens to H. A. Pilsbry at the Academy of Natural Sciences of Philadelphia as well as to Paul Bartsch at the U.S. National Museum. However, he separated the shells from the preserved bodies, sending the shells to Bartsch in 1890 and the preserved bodies to Pilsbry in 1893, thereby raising an element of doubt that the bodies may not have come from the same population as the shells.

PILSBRY duly figured the reproductive system in the *Manual of Conchology* (1895:pl. 59, fig. 87) and cited it as *Epiphragmophora (Helminthoglypta) traskii* v. *cuyamacensis* Hemph. He later stated (PILSBRY, 1939:145) that he withheld description of the shells because he did not wish to trespass on Hemphill's field. He also stated: "with the locality, which I gave in 1897, there would be little doubt of what was intended." This reference (PILSBRY, 1897), however, merely repeated, with correct spelling: "*Epiphragmophora traskii cuyamacensis* Hemph. Cuyamaca Mt., San Diego Co."

Two decades later, P. BARTSCH (1916) published a description of the shell as *Epiphragmophora cuyamacensis cuyamacensis* Bartsch, 1916, and considered Pilsbry's earlier name to be a *nomen nudum*.

In 1933, Pilsbry, accompanied by Joshua L. Bailey, went to the Cuyamaca Mountains and collected snails at a locality "¾ of a mile above Cuyamaca Lake, ½ mile south of road at the 'beef pasture' under heaps of rotten wood in mixed evergreen and deciduous woods." There was no doubt in his mind that he had obtained *H. cuyamacensis cuyamacensis* and he figured the reproductive anatomy of this snail as fig. 71B (PILSBRY, 1939), labeled *H. cuyamacensis*, Cuyamaca Mountains. This anatomy,

however, was considerably different from the one published in the *Manual of Conchology* in 1895 and because he was uncertain about the origin of the bodies sent by Hemphill in 1893, he again figured an anatomy of the 1893 shipment as fig. 73 (PILSBRY, 1939), labeling it "Genitalia of a *Helminthoglypta* of uncertain status." It can now be ascertained, from fig. 73 (PILSBRY, 1939), that the genitalia are typical of the subgenus *Rothelix* Miller, 1985, and therefore are probably those of *H. c. cuyamacensis* Bartsch, 1916 (MILLER, 1985). On the other hand, the genitalia of fig. 71B (PILSBRY, 1939) are typical of the nominate subgenus; they appear to be referable to those of *H. thermimontis* Berry, 1953, but a firm identification will require a precise pinpointing of Pilsbry's exact locality and its population and a careful, detailed, microscopic examination of the reproductive anatomy.

During the 1960's, W. O. Gregg and W. B. Miller collected extensively at several localities in the Cuyamaca Mountains. They found populations of snails along the main highway in the Cuyamacas that correspond precisely with size, sculpture, description, and illustration of Bartsch's specimens as well as PILSBRY's original figure of the genitalia (1895:pl. 59, fig. 87; 1939:fig. 73). This locality can now be more precisely identified as "Cuyamaca Mountains, along Cold Stream in the vicinity of Cold Spring, 32°56.5'N, 116°33.8'W, elev. 4400 ft. (1350 m), in rotting logs." It can now be considered the more detailed type locality of *H. cuyamacensis cuyamacensis* Bartsch, 1916.

In the process of exploring the Cuyamaca Mountains, several populations of other species of *Helminthoglypta* were also discovered. Most of these populations live in rotting logs, as does *H. c. cuyamacensis*. One population, however, differs from all the others in that it is a rock

dweller, located in a large rock pile just below the summit of Cuyamaca Peak. Furthermore, this population does not belong in the subgenus *Rothelix* Miller, 1985, as does *H. c. cuyamacensis*, but rather in the nominate subgenus. Its anatomy clearly indicates that it is a new species, described below.

Helminthoglypta (Helminthoglypta) milleri
R. L. Reeder, spec. nov.

(Figures 1-4)

Diagnosis: A large sized, depressed *Helminthoglypta* with radial growth wrinkles and moderately papillose sculpture.

Description of shell of holotype: Shell (Figures 2-4) large, depressed, with conic spire, helicoid, umbilicate, the umbilicus contained about 7 times in the diameter of the shell. Color light brown, glossy, with a darker reddish-brown band on the round shoulder. Aperture broad, nearly round, with peristome moderately reflected, expanded slightly more at columellar junction. Embryonic shell of $1\frac{3}{4}$ whorls with faint radial wrinkles and minute papillae. Post-embryonic whorls with increasingly coarse radial growth wrinkles, superimposed with moderately dense papillae. Papillae weaker on base of shell, becoming prominent again within the umbilicus. Spiral sculpture wanting. Diameter 26.6 mm, height 12.3 mm, diameter of umbilicus 3.8 mm, number of whorls $5\frac{1}{4}$.

Reproductive anatomy of holotype: The reproductive system (Figure 1) is typical of the genus, having a large atrial sac with a dart sac at its proximal end. There are two mucus glands with mucus bulbs, the ducts of which form a common duct before entering the upper portion of the atrial sac. The spherical spermatheca is large with a long duct bearing a spermathecal diverticulum about midway along its length. The penis and epiphallus form a continuous duct with the epiphallus bearing a relatively long epiphallic caecum at its proximal end. The penis is divided into a short lower penis and a long upper penis, the latter being a double-walled tube. The upper penis is a cylindrical duct of nearly uniform diameter. The lower penis is initially as wide as the upper penis at their junction, then tapering into a venturi-like constriction, the throat of which is moderately narrow. There is no verge. The vas deferens passes around the dart apparatus and the penial retractor muscle inserts on the epiphallus. Measurements of distinctive structures are as follows:

Penis	17.7 mm
Epiphallus	27.4 mm
Epiphallic caecum	17.1 mm
Spermathecal duct	33.7 mm
Spermathecal diverticulum	23.1 mm

Variations in paratypes: A total of 10 adult and 3 immature shells was examined. The largest adult paratype

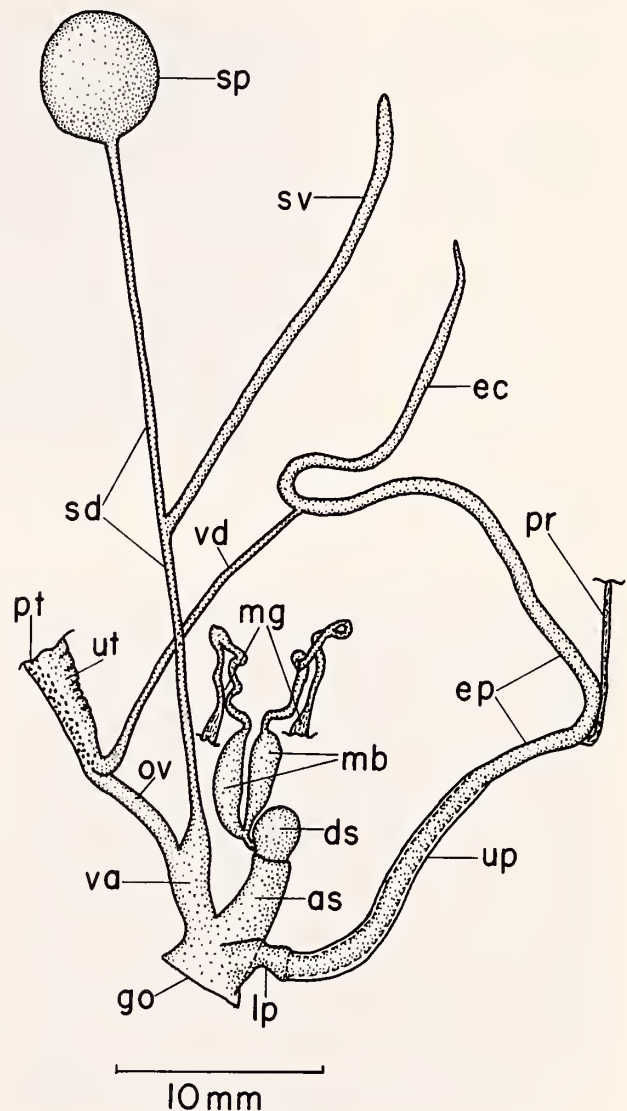
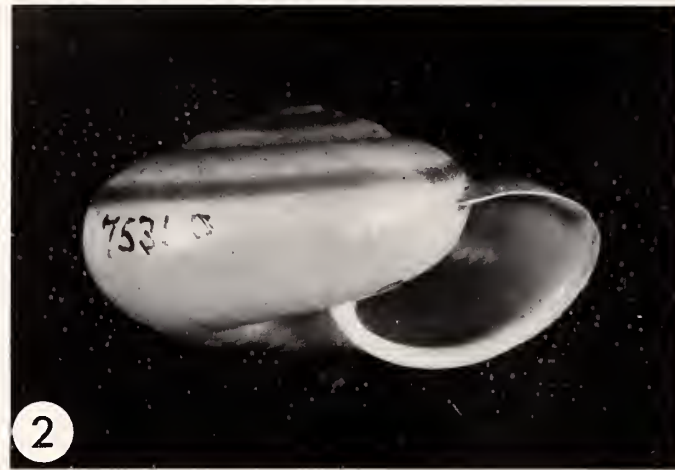


Figure 1

Portion of reproductive system of *Helminthoglypta milleri* Reeder, spec. nov., prepared from projection of stained whole mount of holotype; as, atrial sac; ds, dart sac; ec, epiphallic caecum; ep, epiphallus; go, genital orifice; lp, lower part of penis; mb, mucus gland bulb; mg, mucus gland membranes; ov, oviduct; pr, penial retractor muscle; pt, prostate; sd, spermathecal duct; sp, spermatheca; sv, spermathecal diverticulum; up, upper part of penis; ut, uterus; va, vagina; vd, vas deferens.

measures 26.7 mm in diameter and 15.2 mm in height, and the smallest measures 22.2 mm and 12.8 mm respectively. All of the specimens demonstrate the radial wrinkles and papillae as described and two of the adult shells show a few faint spiral incised lines above the shoulder on the body whorl just behind the aperture.

Disposition of types: **Holotype:** Santa Barbara Museum of Natural History, No. 33915. **Paratypes:** The Academy



Explanation of Figures 2 to 4

Helminthoglypta milleri Reeder, spec. nov. Shell of holotype, SBMNH No. 33915; diameter 26.6 mm.

Figure 2. Aperture view.

Figure 3. Apical view.

Figure 4. Umbilical view.

of Natural Sciences of Philadelphia, No. 359212; U.S. National Museum, No. 842307; W. B. Miller collection, No. 2596, 7118, and 7440; R. L. Reeder collection, No. 574.

Type locality: San Diego County, California; Cuyamaca Peak, Cuyamaca Mountains; in rocks at junction of Burnt Pine Fire Road and Cuyamaca Peak Road; 32°56.9'N, 116°36.3'W; elevation 1900 m (6200 ft.).

Discussion: The long, cylindrical, double-tubed portion of the penis, and the short, thin, saccular, lower part of the penis clearly establish that *Helminthoglypta milleri*

belongs in the nominate subgenus. In that subgenus, its nearest geographical relatives are *H. tudiculata* (Binney, 1843) and *H. waltoni* Gregg & Miller, 1976. *Helminthoglypta milleri* can be separated from *H. tudiculata* and its subspecies by shell characters alone in that *H. tudiculata* and its subspecies have a strongly malleated shell while *H. milleri* has a papillose shell. From *H. waltoni* it can be separated by its reproductive anatomy in that *H. milleri* has a long, stout, cylindrical upper part of the penis while *H. waltoni* has a decidedly club-shaped upper part of the penis. Farther to the north, in the Hot Springs Mountains, another species of *Helminthoglypta* with papillose shells, *H. thermimontis*

Berry, 1953, appears to be related to *H. milleri*, but it can be separated by its reproductive anatomy in that *H. thermimontis* has an upper penis whose diameter decreases markedly before it joins the narrower lower penis; in turn the venturi-shaped lower penis has a very constricted throat, whereas that of *H. milleri* is only moderately constricted. Moreover, the shell of *H. thermimontis* is considerably more papillose than that of *H. milleri*. It is probable that *H. milleri*, *H. waltoni*, and *H. thermimontis* evolved from a common papillose ancestor. *Helminthoglypta thermimontis* speciated and adapted to an environment of fallen logs and humus in the Hot Springs Mountains, *H. waltoni* to a rock-dwelling existence in the Laguna Mountains, and *H. milleri* to its isolated rock pile on top of Cuyamaca Peak.

Distribution and habitat: *Helminthoglypta milleri* is currently known only from the type locality on Cuyamaca Peak. Vegetation at this locality consists principally of *Quercus kelloggi*, *Quercus chrysolepis*, *Pinus lambertiana*, *Abies concolor*, *Libocedrus decurrens*, and *Arctostaphylos* sp.

Etymology: This species is named for Walter B. Miller, friend and mentor, who has provided me the opportunity to study the *Helminthoglypta* of southern California.

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